UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/705,908 | 11/13/2003 | Anton Nekovar | 32860-000660/US | 7317 |

30596 7590 05/16/2008
HARNESS, DICKEY & PIERCE, P.L.C.
P.O.BOX 8910
RESTON, VA 20195

| EXAMINER | |
|---|---|
| HO, ALLEN C | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2882 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 05/16/2008 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/705,908 | NEKOVAR, ANTON | |
| | Examiner | Art Unit | |
| | Allen C. Ho | 2882 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *04 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,3-5,8,11,12,15,17,18,20-24,26 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-5, 8, 11, 12, 15, 17, 18, 20-24, 26, and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20071029*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3, 17, 18, 20-24, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura *et al.* (U. S. Pub. No. 2002/0186813 A1) in view of Mazess *et al.* (U. S. Patent No. 6,282,261 B1) and Wen *et al.* (U. S. Patent No. 6,818,483 B2).

With regard to claim 1, Tamura *et al.* disclosed a diagnostic system (Fig. 21) that comprises: a CCD camera (**5004**; paragraph [0013]); a device (x-ray radiation switch) for generating external trigger pulses (paragraph [0012]); and a system control (**5002**) configured to: (1) control a readout of the CCD camera without a desired signal including image information at regular time intervals (TI) in response to rest pulses (Vr) at regular intervals (TI) in the absence of x-radiation (paragraph [0037]); and (2) control triggering of a readout of the CCD camera without a desired signal including image information and a subsequent triggering of an exposure of the CCD camera when an external trigger pulse (x-ray radiation request signal) occurs at a point (T1) in time at which no read out of the CCD camera is to take place (T1 is a timing other than those of the refresh and idle read processes, paragraphs [0037], [0038], and [0044]); wherein if the time elapsed ($\leq$TI when an external trigger pulse occurs during a readout/initialization) between a most recent rest pulse and an external trigger pulse is less than a

duration (TI = T5-T1) of the readout (initialization) of the CCD camera without a desired signal including image information, a readout without a desired signal including image information is suppressed (interrupted), and exposure of the CCD camera is triggered directly by the external trigger pulse (paragraph [0045]).

However, Tamura *et al.* failed to disclose an x-ray image amplifier having a fluorescent output screen, and a CCD camera coupled to the fluorescent output screen of the x-ray image amplifier via an optical system, wherein the CCD camera has an interline transfer image converter.

Mazess *et al.* disclosed an x-ray image amplifier having a fluorescent output screen (**374**), and a CCD camera (**375**, **504**, **558**) coupled to the fluorescent output screen of the x-ray image amplifier via an optical system (**502**, **508**). Such an imaging system allows a zooming feature useful for providing higher resolution and greater magnified images (column 25, lines 40-48).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employing an x-ray image amplifier having a fluorescent output screen, and a CCD camera coupled to the fluorescent output screen of the x-ray image amplifier via an optical system, since a person would be motivated to magnify a region of interest for a closer look.

Wen *et al.* disclosed a CCD camera having an interline transfer image converter. Wen *et al.* explained that an interline transfer CCD camera producing high frame rate video images is ideal for fluoroscopic imaging (column 5, line 51 - column 6, line 52).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employing a CCD camera with an interline transfer image converter, since a person would be motivated to perform fluoroscopic imaging with a high speed interline transfer CCD camera.

With regard to claim 3, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* disclosed the diagnostic system as claimed in claim 1, wherein, when an external trigger pulse occurs at a point in time at which no readout of the CCD camera is to take place, a readout without a useful signal is initially carried out and then the diagnostic system is subsequently triggered for the emission of x-radiation via an x-ray emitter (Tamura *et al.*, paragraphs [0038]-[0044]).

With regard to claim 17, Tamura *et al.* disclosed a diagnostic system, comprising: a CCD camera (**5004**); means (x-ray radiation switch) for generating an external trigger pulse; and means (**5002**) for providing a readout of the CCD camera without a desired signal including image information in response to reset pulses (Vr) generated at regular intervals (TI) and before an exposure of the CCD camera when an external trigger pulse (x-ray radiation request signal) is generated at a time when no readout of the CCD is to take place (T1 is a timing other than those of the refresh and idle read processes, paragraphs [0037]-[0044]), and for suppressing (interrupting) a (current) readout (initialization) without a desired signal including image information before an exposure of the CCD camera when an external trigger pulse is generated at a time when a readout of the CCD camera is to take place (paragraph [0045]), wherein if the time elapsed ($\leq$TI when an external trigger pulse occurs during a readout/initialization) between a most recent reset pulse and an external trigger pulse is less than a duration (TI = T5-T1) of the readout (initialization) of the CCD camera without a desired signal including image information,

a readout without a desired signal including image information is suppressed (interrupted), and exposure of the CCD camera is triggered directly by the external trigger pulse (paragraph [0045]).

However, Tamura *et al.* failed to disclose an x-ray image amplifier having a fluorescent output screen, and a CCD camera coupled to the fluorescent output screen of the x-ray image amplifier via an optical system, wherein the CCD camera has an interline transfer image converter.

Mazess *et al.* disclosed an x-ray image amplifier having a fluorescent output screen (**374**), and a CCD camera (**375**, **504**, **558**) coupled to the fluorescent output screen of the x-ray image amplifier via an optical system (**502**, **508**). Such an imaging system allows a zooming feature useful for providing higher resolution and greater magnified images (column 25, lines 40-48).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employing an x-ray image amplifier having a fluorescent output screen, and a CCD camera coupled to the fluorescent output screen of the x-ray image amplifier via an optical system, since a person would be motivated to magnify a region of interest for a closer look.

Wen *et al.* disclosed a CCD camera having an interline transfer image converter. Wen *et al.* explained that an interline transfer CCD camera producing high frame rate video images is ideal for fluoroscopic imaging (column 5, line 51 - column 6, line 52).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employing a CCD camera with an interline transfer image converter,

since a person would be motivated to perform fluoroscopic imaging with a high speed interline transfer CCD camera.

With regard to claim 18, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* disclosed the diagnostic system as claimed in claim 17, wherein the means for providing is configured to read the CCD camera without a useful signal at a regular time intervals in the absence of x-radiation (Tamura *et al.*, paragraph [0037]).

With regard to claim 20, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* disclosed the diagnostic system as claimed in claim 17, wherein, when an external trigger pulse occurs at a point in time at which no readout of the CCD camera is to take place, a readout without a useful signal is initially carried out and then the diagnostic system is subsequently triggered for the emission of x-radiation via an x-ray emitter (Tamura *et al.*, paragraphs [0037]-[0044]).

With regard to claim 21, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* disclosed the diagnostic system as claimed in claim 1, wherein the external trigger pulses are generated in a non-predetermined fashion (when x-ray radiation switch is pressed).

With regard to claim 22, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* disclosed the diagnostic system as claimed in claim 1, wherein the external trigger pulses are generated in a non-periodic fashion (when x-ray radiation switch is pressed).

With regard to claim 23, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* disclosed the diagnostic system as claimed in claim 17, wherein the external trigger pulses are generated in a non-predetermined fashion (when x-ray radiation switch is pressed).

With regard to claim 24, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* disclosed the diagnostic system as claimed in claim 17, wherein the external trigger pulses are generated in a non-periodic fashion (when x-ray radiation switch is pressed).

With regard to claim 27, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* disclosed the diagnostic system as claimed in claim 1, wherein the readout without a desired signal including image information is suppressed in favor of exposure of the CCD camera, which is directly triggered by the external trigger (Tamura *et al.*, paragraphs [0012] and [0045]).

3. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura *et al.* (U. S. Pub. No. 2002/0186813 A1), Mazess *et al.* (U. S. Patent No. 6,282,261 B1), and Wen *et al.* (U. S. Patent No. 6,818,483 B2) as applied to claims 1 and 3 above, and further in view of Haaker *et al.* (U. S. Patent No. 5,117,446).

With regard to claims 4 and 8, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* disclosed the diagnostic system as claimed in claims 1 and 3. However, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* failed to teach that the device for generating external trigger pulses is an ECG electrode.

Haaker *et al.* disclosed a diagnostic system comprising an ECG electrode (**26**) for generating external trigger pulses. Haaker *et al.* taught that the same cardiac phase could be repeatedly imaged by synchronizing the x-ray pulses with an ECG signal (column 3, lines 30-39).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an ECG for generating external trigger pulses, since a person would be motivated to examine a particular cardiac phase by synchronizing x-ray pulses with an ECG signal.

4. Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura *et al.* (U. S. Pub. No. 2002/0186813 A1), Mazess *et al.* (U. S. Patent No. 6,282,261 B1), and Wen *et al.* (U. S. Patent No. 6,818,483 B2) as applied to claims 1 and 3 above, and further in view of Watanabe *et al.* (U. S. Patent No. 6,412,978 B1) and Casey *et al.* (U. S. Patent No. 5,175,754).

With regard to claims 5 and 11, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* disclosed the diagnostic system as claimed in claims 1 and 3. However, Tamura *et al.*, Mazess *et al.*, and Wen *et al.* failed to teach that the device for generating external trigger pulses is an angle sensor mounted at a C-arm of the diagnostic system.

Watanabe *et al.* disclosed a diagnostic system that comprises a C-arm and an angle sensor (**81**) mounted at the C-arm.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to mount the diagnostic system disclosed by Tamura *et al.* on the C-arm disclosed by Watanabe *et al.*, since a person would be motivated to image a patient from different imaging angles.

Casey *et al.* disclosed a diagnostic system that comprises a device (**36**) for generating external trigger pulses (**42**), which triggers an x-ray controller (**30**) and a data acquisition system (**34**). Casey *et al.* taught that this device could be programmed to generate a trigger pulses that are a function of signal pulses of an angle sensor (**40**), which provides imaging flexibility (column 3, line 41 column 4, line 2).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a device disclosed by Casey *et al.* for generating trigger pulses, since a person would be motivated to control the frequency of a triggering pulse.

5. Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura *et al.* (U. S. Pub. No. 2002/0186813 A1), Mazess *et al.* (U. S. Patent No. 6,282,261 B1), Wen *et al.* (U. S. Patent No. 6,818,483 B2), and Haaker *et al.* (U. S. Patent No. 5,117,446) as applied to claims 4 and 8 above, and further in view of Watanabe *et al.* (U. S. Patent No. 6,412,978 B1) and Casey *et al.* (U. S. Patent No. 5,175,754).

With regard to claims 12 and 15, Tamura *et al.*, Mazess *et al.*, Wen *et al.*, and Haaker *et al.* disclosed the diagnostic system as claimed in claims 4 and 8. However, Tamura *et al.*, Mazess *et al.*, Wen *et al.*, and Haaker *et al.* failed to teach that the device for generating external trigger pulses is an angle sensor mounted at a C-arm of the diagnostic system.

Watanabe *et al.* disclosed a diagnostic system that comprises a C-arm and an angle sensor (**81**) mounted at the C-arm.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to mount the diagnostic system disclosed by Tamura *et al.* on the C-arm disclosed by Watanabe *et al.*, since a person would be motivated to image a patient from different imaging angles.

Casey *et al.* disclosed a diagnostic system that comprises a device (**36**) for generating external trigger pulses (**42**), which triggers an x-ray controller (**30**) and a data acquisition system (**34**). Casey *et al.* taught that this device could be programmed to generate a trigger pulses that

are a function of signal pulses of an angle sensor (**40**), which provides imaging flexibility (column 3, line 41 column 4, line 2).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a device disclosed by Casey *et al.* for generating trigger pulses, since a person would be motivated to control the frequency of a triggering pulse.

6. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamura *et al.* (U. S. Pub. No. 2002/0186813 A1) in view of Wen *et al.* (U. S. Patent No. 6,818,483 B2).

With regard to claim 26, Tamura *et al.* disclosed a diagnostic system (Fig. 21) that comprises: a CCD camera including an image converter (**5004**; paragraph [0013]); a device (x-ray radiation switch) for generating external trigger pulses (paragraph [0012]); and a system control (**5002**) configured to: (1) control a readout of the CCD camera without a desired signal including image information at regular time intervals (TI) in response to rest pulses (Vr) at regular intervals (TI) in the absence of x-radiation (paragraph [0037]); and (2) control triggering of a readout of the CCD camera without a desired signal including image information and a subsequent triggering of an exposure of the CCD camera when an external trigger pulse (x-ray radiation request signal) occurs at a point (T1) in time at which no read out of the CCD camera is to take place (T1 is a timing other than those of the refresh and idle read processes, paragraphs [0037], [0038], and [0044]); wherein if the time elapsed ($\leq$TI when an external trigger pulse occurs during a readout/initialization) between a most recent rest pulse and an external trigger pulse is less than a duration (TI = T5-T1) of the readout (initialization) of the CCD camera without a desired signal including image information, a readout without a desired signal including image information is suppressed (interrupted), and exposure of the CCD camera is

triggered directly by the external trigger pulse (paragraph [0045]), and the image converter accumulates charge in a light-sensitive region (**5021**) and transfers the accumulated charge to a memory region (**5026**) by the trigger pulse (paragraph [0035]), wherein after transferring the accumulated charge, the actual exposure of the light-sensitive region of the image converter is performed, and actual readout of the accumulated charge corresponding to the exposure is performed and fed to an image system as a video signal.

However, Tamura *et al.* did not disclose a CCD camera including an interline transfer image converter.

Wen *et al.* disclosed a CCD camera having an interline transfer image converter. Wen *et al.* explained that an interline transfer CCD camera producing high frame rate video images is ideal for fluoroscopic imaging (column 5, line 51 - column 6, line 52).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employing a CCD camera with an interline transfer image converter, since a person would be motivated to perform fluoroscopic imaging with a high speed interline transfer CCD camera.

***Response to Amendment***

7. Applicant's amendments filed 04 February 2008 with respect to claim 26 have been fully considered and are persuasive. The rejection of claim 26 under 35 U.S.C. 112, second paragraph, has been withdrawn.

***Response to Arguments***

8. Applicant's arguments with respect to claims 1, 3-5, 8, 11, 12, 15, 17, 18, 20-24, 26, and 27 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 9:00 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Allen C. Ho/
Primary Examiner
Art Unit 2882

12 May 2008